

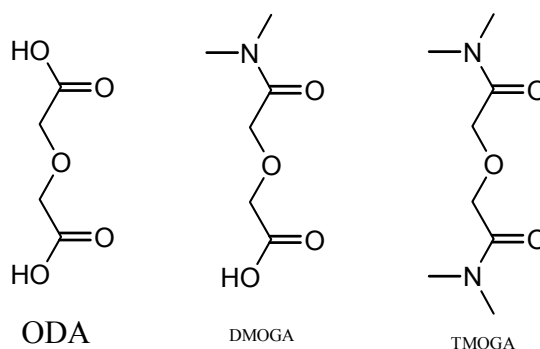
# Complexation of Actinides/Lanthanides with DMOGA and TMOGA, Amide Derivatives of Oxydiacetic Acid

Guoxin Tian and Linfeng Rao

Glenn T. Seaborg Center, Lawrence Berkeley National Laboratory, 1 Cyclotron Road, Berkeley, CA 94720

Oxydiacetic acid (ODA) forms strong complexes with f-block metal ions in aqueous solutions with a variety of coordination modes. Its alkylidiamide derivatives, in which the two carboxylate groups are substituted with two amide groups, have been shown to be effective extractants for the separation of minor actinides from high level liquid waste. In order to understand the effect of the change of carboxyl groups of ODA on the coordination modes and strength with metal ions, two amide derivatives of ODA, N,N-dimethyl-3-oxa-glutaramic acid (DMOGA), and N,N,N',N'-tetramethyl-3-oxa-glutaramide (TMOGA), were synthesized and their complexation with f-block metal ions was studied by potentiometry, calorimetry, and spectrophotometry. Complex formation constants, enthalpy and entropy of complexation have been calculated.

Preliminary results suggest that, unlike ODA which can be bidentate or tridentate, DMOGA and TMOGA seem to exclusively form tridentate complexes with most f-block metal ions (two 5-membered rings). The trends in thermodynamic parameters from ODA to DMOGA and TMOGA are discussed in terms of the structural changes.



This work was supported by the Director, Office of Science, Office of Basic Energy Sciences, Division of Chemical Sciences, under U.S. Department of Energy Contract No. DE-AC03-76SF0098 at the Lawrence Berkeley National Laboratory.